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# SEARCH FOR THE COMPANION IN THE $\beta$ CrB SPECTRUM *

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Spectroscopic analyses of the $\beta$ CrB spectrum have been performed in the past without taking into consideration the double nature of this well-known cool Ap star (e.g. Hiltner, 1945; Hack, 1958; Adelman, 1973). Recently, Kamper et al. (1990) have re-examined the astrometric (interferometric and visual) and spectroscopic (radial velocity) data and have given an improved orbit for the $\beta$ CrB system (P=10.55 yr) and the passage at periastron at 1991.02.

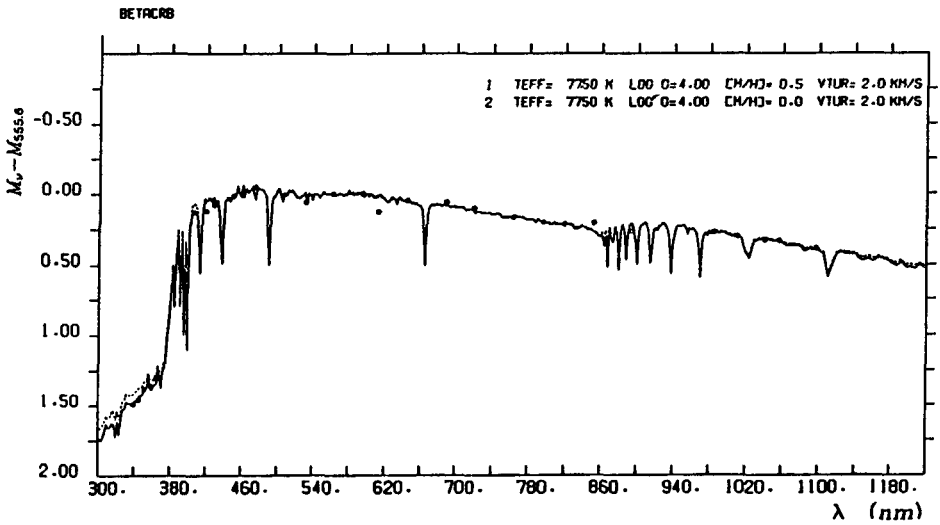


Fig. 1a. Observed and computed fluxes for the visual range.

* Based on observations collected at the Observatoire de Haute Provence (OHP), France

According to these authors, the B companion is likely to be a main sequence F star with a broad-lined spectrum and an estimated magnitude difference with the main component of 1.6.

In May 1991, we observed $\beta$ CrB in some selected $\lambda\lambda$ ranges ($\lambda$4200, $H_\gamma$, Mg II 4481, $\lambda$5900, $\lambda$6700) at the OHP 1.5m telescope with the Aurelie spectrograph at resolution 60 000.

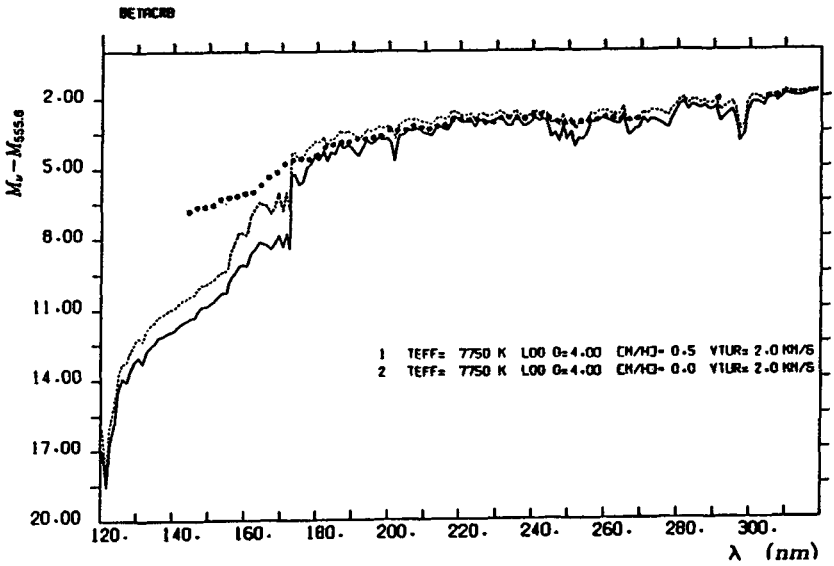


Figure 1b Observed and computed fluxes for the UV range.

We compared the observed energy flux distribution with the theoretical one predicted by Kurucz (new models, 1991). The observational data are taken from Breger (1976) and from S2/68 (Jamar et al., 1976) for visual and UV ranges respectively. The best fit between observed and computed data is given by $T_{eff}$=7750 K, log g=4. and scaled abundances +0.5 (see Figures 1 a and b). The $H_\gamma$ profile computed with these parameters is overlapped on the observed one in Figure 2; several metallic lines are not well reproduced, since we have not looked for, and adjusted accordingly, the abundances of each element; however, it is evident that no trace of asymmetry, due to the presence of the B companion, can be detected in the $H_\gamma$ profile.

We have also compared the same region of the $\beta$ CrB spectrum with that of another cool Ap star of similar parameters, HD 188041. Both stars were observed on the same night with the same instrumental conditions. The results, plotted in Figure 3, reinforce our conclusion that the observed spectrum of $\beta$ CrB is not affected by the binary nature of the system.

We are profoundly indebted to F. Castelli, who put at our disposal her programs for the comparison of observed and computed data.

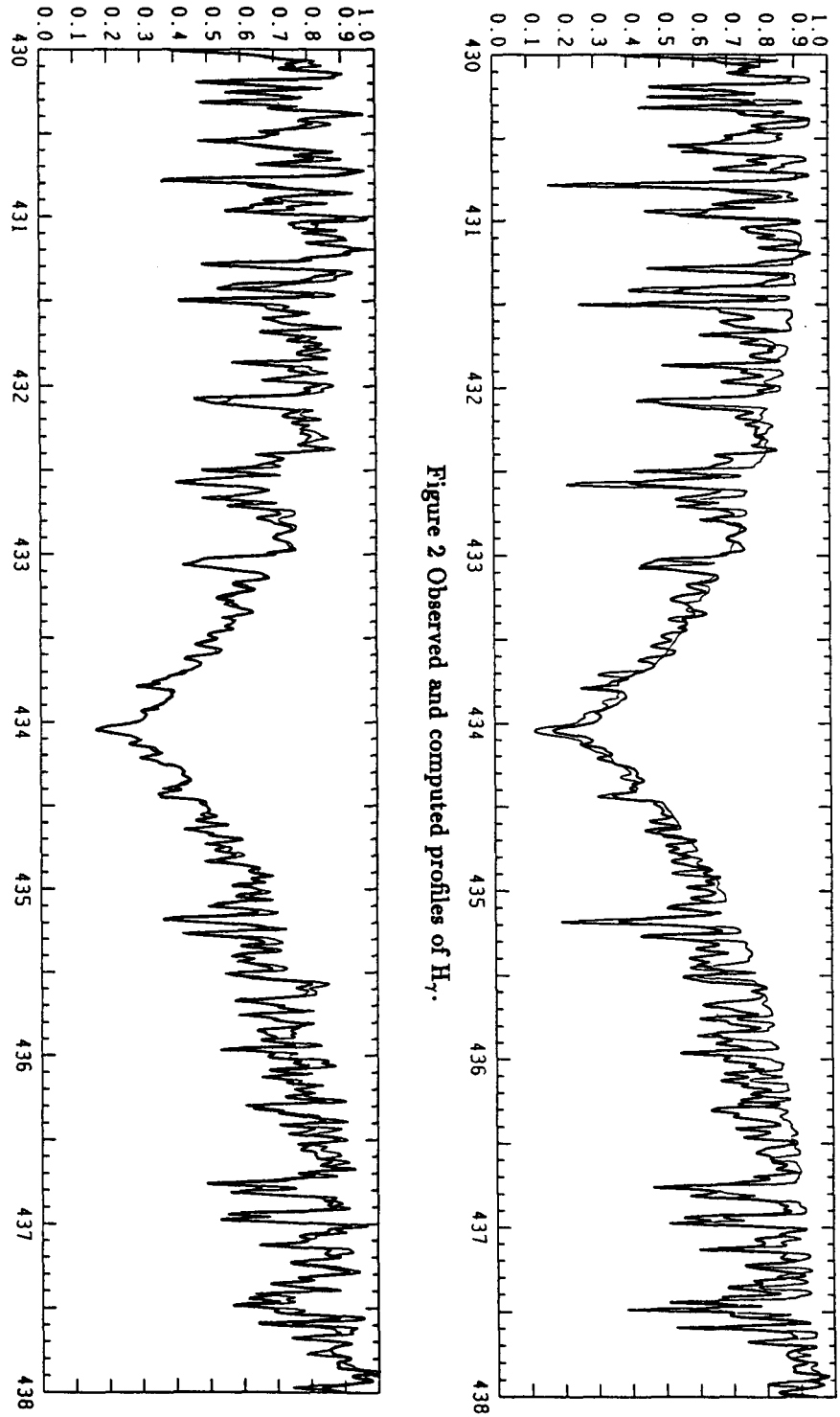


Figure 2 Observed and computed profiles of $H_\gamma$.




Figure 3 $H_\gamma$ profile of $\beta$ CrB overlapped on that of HD 188041.

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